

WHAT IS CLAIMED IS:

1 1. An apparatus for electroplating a rotogravure cylinder out of
2 a plating solution wherein the cylinder is connectable to a current source,
3 the apparatus comprising:

4 a plating tank adapted to support the cylinder and to contain
5 the plating solution so that the cylinder is at least partially disposed into
6 the plating solution;

7 an anode system including at least one anode connectable to
8 the current source and at least partially disposed within the plating
9 solution, wherein the anode includes a conductive core, and a surface
10 material substantially resilient to the plating solution, the surface material
11 covering at least a portion of the conductive core; and

12 an ultrasonic system to introduce wave energy into the
13 plating solution including at least one transducer element mountable
14 within the plating tank and a power generator adapted to provide
15 electrical energy to the at least one transducer element.

1 2. The apparatus of Claim 1 wherein the anode includes
2 titanium.

1 3. The apparatus of Claim 1 wherein the surface material
2 further comprises:

3 a titanium base; and

4 a conductive metal oxide coating.

1 4. The apparatus of Claim 3 wherein the conductive metal oxide
2 coating includes at least one platinum-group metal or platinum-group
3 metal oxide and at least one valve metal or valve metal oxide.

1 5. The apparatus of Claim 3 wherein the conductive metal oxide
2 coating includes iridium or iridium oxide.

1 6. The apparatus of Claim 1 wherein the non-dissolvable
2 conductor is disposed around each side of the cylinder.

1 7. The apparatus of Claim 1 wherein the conductive core is
2 titanium, copper or lead.

1 8. The apparatus of Claim 1 wherein the plating solution
2 includes cuprous oxide.

3 9. The apparatus of Claim 1 wherein the plating solution
4 includes a hardener.

5 10. The apparatus of Claim 1 wherein the surface material
6 includes platinum.

1 11. The apparatus of Claim 1 further comprising:
2 a holding tank;
3 a circulation pump providing flow of plating solution from the
4 holding tank to the plating tank; and
5 a means for maintaining a level of plating solution in the
6 plating tank.

1 12. The apparatus of Claim 11 wherein the holding tank further
2 comprises a fluid heating system, a fluid cooling system, and a mixing
3 system.

1 13. The apparatus of Claim 11 further comprising a filter system
2 for filtering the plating solution flowing from the holding tank to the
3 plating tank.

1 14. The apparatus of Claim 11 wherein the plating tank further
2 comprises a surface material substantially resilient to the plating solution.

1 15. The apparatus of Claim 11 wherein the holding tank further
2 comprises a surface material substantially resilient to the plating solution.

1 16. An apparatus for electroplating a rotogravure cylinder out of
2 a plating solution wherein the cylinder is connectable to a current source,
3 the apparatus comprising:

4 a plating tank adapted to rotatably maintain the cylinder and
5 to contain the plating solution so that the cylinder is at least partially
6 disposed into the plating solution; and

7 an anode at least partially disposed within the plating
8 solution, wherein the anode includes a conductive core, a first layer
9 including titanium securely applied to the conductive core, and a second
10 layer including at least one platinum-group metal or platinum-group metal
11 oxide and at least one valve metal or valve metal oxide, the second layer
12 securely applied to the first layer.

13 17. The apparatus of Claim 16 further comprising an ultrasonic
14 system to introduce wave energy into the plating solution including at
15 least one transducer element mountable within the plating tank and a
16 power generator adapted to provide electrical energy to the at least one
17 transducer element.

1 18. The apparatus of Claim 16 wherein application of the first
2 layer increases the surface area of the conductive core by greater than
3 about 50 percent.

4 19. The apparatus of Claim 16 wherein the second surface
5 material includes a mixture of iridium or iridium oxide and a valve metal or
6 valve metal oxide.

7 20. An apparatus for electroplating a rotogravure cylinder out of
8 a plating solution, wherein the cylinder is connectable to a current source,
9 the apparatus comprising:

10 a plating tank adapted to rotatably maintain the cylinder and
11 to contain the plating solution so that the cylinder is at least partially
12 disposed into the plating solution;

13 an anode system including at least one anode partially
14 disposed within the plating solution, the anode including a titanium core
15 and a surface material including a mixture of iridium or iridium oxide and a
16 valve metal or valve metal oxide; and

17 an ultrasonic system to introduce wave energy into the
18 plating solution including at least one transducer element mountable
19 within the plating tank to the mounting structure and a power generator
20 adapted to provide electrical energy to the at least one transducer
21 element.

1 21. The apparatus of Claim 20 wherein the surface material
2 further includes a layer of titanium applied to the titanium core.